WatchfulEyE

Surge Protective Device

Surge Protective Device

Paperless Datasheet

Going green and protecting environment is manufacturers' responsibility. Each WatchfulEyE product has a link of downloading data sheet on its enclosure:
http://datasheet.watchfuleyesolutions.com/US120254.html

Model & Ordering Code

Model	Ordering Code	MCOV/Uc	Remote Contacts	UPC/EAN Code
WTH-80/B+C/R/1P-275	US120254	275VAC	YES	(0) 811914030669
WTH-80/B+C/1P-275	US120244		NO	(0) 811914030720
WTH-80/B+C/R/1P-320	US120255	320VAC	YES	(0) 811914030676
WTH-80/B+C/1P-320	US120245		NO	(0) 811914030737
WTH-80/B+C/R/1P-385	US120256	385VAC	YES	(0) 811914030683
WTH-80/B+C/1P-385	US120246		NO	(0) 811914030744
WTH-80/B+C/R/1P-420	US120257	420VAC	YES	(0) 811914030690
WTH-80/B+C/1P-420	US120247		NO	(0) 811914030751

Certificates of Products

LISTED E345944 CE RoHS IEC61643-11

More Package

Model with suffix	WTH-80/B+C/R/1P-275	x2pcs	x3pcs	x4pcs
Ordering Code	US120254	US120254x2	US120254x3	US120254x4

Model with suffix	WTH-80/B+C/1P-275	x2pcs	x3pcs	x4pcs
Ordering Code	US120244	US120244x2	US120244x3	US120244x4

Model with suffix	WTH-80/B+C/R/1P-320	x2pcs	x3pcs	x4pcs
Ordering Code	US120255	US120255x2	US120255x3	US120255x4

Model with suffix	WTH-80/B+C/1P-320	x2pcs	x3pcs	x4pcs
Ordering Code	US120245	US120245x2	US120245x3	US120245x4

Model with suffix	WTH-80/B+C/R/1P-385	x2pcs	x3pcs	x4pcs
Ordering Code	US120256	US120256x2	US120256x3	US120256x4

Model with suffix	WTH-80/B+C/1P-385	x2pcs	x3pcs	x4pcs
Ordering Code	US120246	US120246x2	US120246x3	US120246x4

Model with suffix	WTH-80/B+C/R/1P-420	x2pcs	x3pcs	x4pcs
Ordering Code	US120257	US120257x2	US120257x3	US120257x4

Model with suffix	WTH-80/B+C/1P-420	x2pcs	x3pcs	x4pcs
Ordering Code	US120247	US120247x2	US120247x3	US120247x4

Surge Protective Device

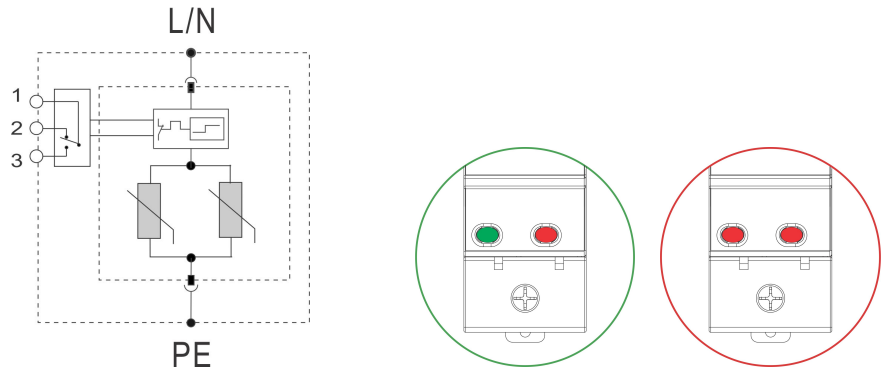
Description

In accordance with: IEC 61643-11 - Class I+II and UL1449 Type 4 Location
Location of use: main sub-distribution boards, branch sub-distribution boards
Plug-in module and separate base design enables convenient maintenance.
Internal thermal disconnect devices help ensure safe or at end-of-life

WTH-80/B+C/R/1P Series Technical Data	
Requirement Class to IEC61643-11	Class I+II
IEEE Category Rating	C, B & A
Nominal Discharge Current (In)	40kA
Max. Discharge Current (Imax)	80kA
Pulsed Current (Iimp)	10kA
Protection Modes	L-PE, N-PE
Protective Element	MOV
Follow Current (If)	NO
Response Time (tA)	<5ns
Leakage Current (at 75%U1mA)	<20μA
Thermal Protection	YES
Protection Rating (IP Code)	IP 20
Short Circuit Current Ratings (SCCR)	25kA rms
Max. Back-up Fuse (if mains >100A)	100A gL (circuit-breaker: <50A)
Surge Life at 3kA (8/20μs)	>5000 events
Temperature Range	- 40°F to 176°F (-40°C to 80°C)
Relative Humidity	0% to 95% noncondensing
Maximum Operating Altitude	10,000 feet (3000m)
Terminal Cross Section	35mm² (solid) / 25mm² (stranded)
Stripping Length Contacts	0.6inches (15mm)
Terminal Screw Torque	Max. 3.5Nm
DIN Rail EN60715	35mm top-hat rail
Dimensions DIN 43880	36mm (2TE)
Housing Material	Thermoplastic (UL94 V-0)
Housing Design	Modular design
Net Weight Per Unit	0.5Lb (227g)

Surge Protective Device

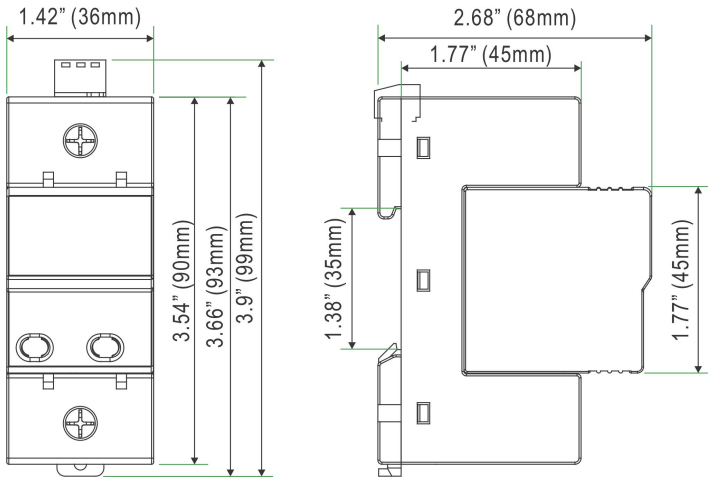
Surge Protection Connection Diagram



Indication of two levels of surge protection
The capability of displaying 50 percent of surge protection capacity: under normal circumstances, with two MOVs' protection at the same time, the module can realize Class I surge protection; in case that one of the indicator windows indicates red, there's still 50% of surge protection capacity to meet Class II surge protection requirements, and the module shall be replaced timely at this point.

Maximum Continuous Operating Voltage (MCOV/Uc)	275VAC	320VAC	385VAC	420VAC
Voltage Protection Level (Up)	1.8kV	2.0kV	2.1kV	2.2kV
Residual Voltage (Ures)	1.0kV	1.1kV	1.2kV	1.4kV

Dimensions

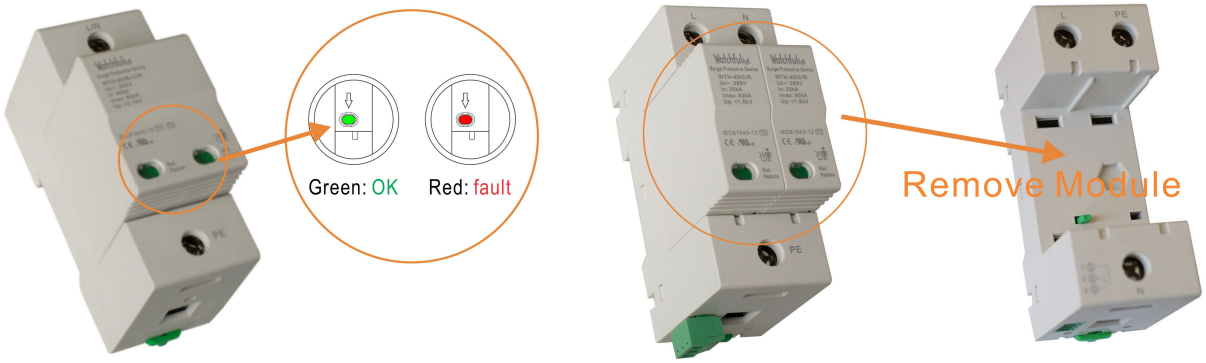


Remote Contacts (Dry Contacts)

1: COM (Common)
2: NC (Normally Close)
3: NO (Normally Open)

Contact Ratings	125VAC/3A, 250VAC/1.5A
Terminal Cross Section	Max. 1.5mm²
Stripping Length Contacts	0.25 inches (6-7mm)
Remote Terminal Torque	0.25Nm

Fault Indication



Common Terms and Definitions

1. Normal operating voltage rating (Un)
2. Maximum Continuous Operating Voltage (Uc/MCOV):
Maximum r.m.s. voltage, which may be continuously applied to the surge protective device's mode of protection.
3. Nominal Discharge Current for Class II Test (In):
crest value of the current through the surge protective device having a current waveshape of 8/20μs.
4. Maximum Discharge Current (Imax):
Crest value of a current through the surge protective device having an 8/20μs waveshape and magnitude according to the manufacturers specification. Imax is equal to or greater than In.
5. Voltage Protection Level (Up):
Maximum voltage to be expected at the surge protective device terminals due to an impulse stress with defined voltage steepness and an impulse stress with a discharge current with given amplitude and waveshape.
6. Residual Voltage (Ures):
Crest value of voltage that appears between the terminals of an surge protective device due to the passage of discharge current.
7. IEEE 62.41
CATEGORY C: outdoor overhead lines, service entrance (most severe)
CATEGORY B: major feeder, short branch circuits, service panel (indoor)
CATEGORY A: long branch circuits, receptacles (indoor) (least severe)

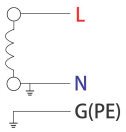
How to choose a suitable Uc(MCOV) value

Note: Uc >1.15Un
The relationship between two parameters Uc and Up of a surge protective device is proportional.
If Uc is small, the value of Up is also small; surge protective devices with smaller Up can provide better surge protection.
Whether to choose smaller Uc depends on the voltage stability of the grid.
If you choose surge protective devices with smaller Uc for the grid with instable voltage, the surge protective devices will frequently work while the grid voltage fluctuates, resulting in shortening surge protective device's product life.
If you choose larger Uc, and the value of Up is accordingly large, the surge protective efficiency will not be so fine.
If you are unsure of the voltage stability of the grid,
it is suggested to calculate MCOV(Uc) using the following formula: $\sqrt{2}$ Un < Uc < $\sqrt{3}$ Un

AC Network (Un)	MCOV(Uc), L/N-PE Protection Mode
110V	150V
120/208V	150V
127/220V	150V
220/380V	275V, 320V, 385V
230/400V	275V, 320V, 385V, 420V
240/415V	320V, 385V, 420V
277/480V	320V, 385V, 420V
347/600V	550V, 690V

AC Network Connection Diagram (1/2)

1



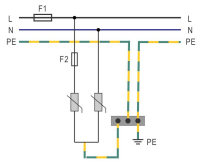
Single Phase
2 Wire + Ground

AC System Voltage

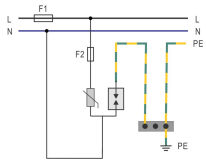
L-N:

110V, 120V, 127V
220V, 230V, 240V
277V, 480V

2P Combination



1P+NPE Combination



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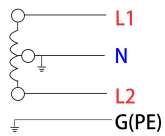


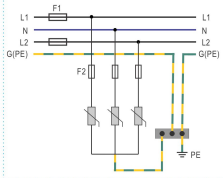
Split Phase
3 Wire + Ground

AC System Voltage

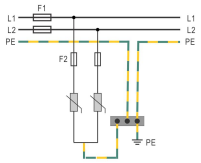
L-N/L-L:

120/240V
127/254V
240/480V
277/480V

3P Combination



2P Combination



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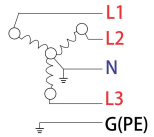


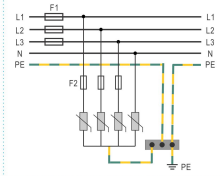
3 Phase Wye
4 Wire + Ground

AC System Voltage

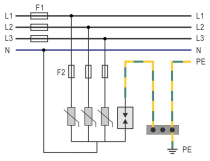
L-N/L-L:

120V/208Y
127V/220Y
220V/380Y
230V/400Y
240V/415Y
277V/480Y
347V/600Y

4P Combination



3P+NPE Combination



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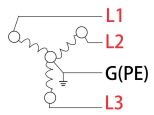


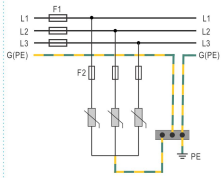
3 Phase Wye
3 Wire + Ground

AC System Voltage

L-L:

480V

3P Combination



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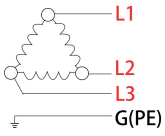


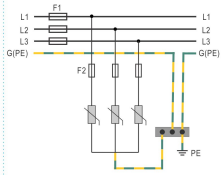
3 Phase Delta
3 Wire + Ground

AC System Voltage

L-L:

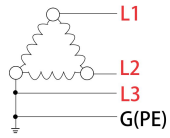
240V
480V
600V

3P Combination



AC Network Connection Diagram (2/2)

6

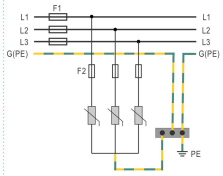


3 Phase Delta
3 Wire + Ground

AC System Voltage

L-L:
240V
480V
600V

3P Combination



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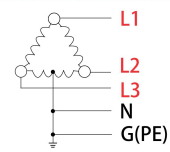
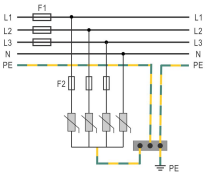


3 Phase Delta
4 Wire + Ground

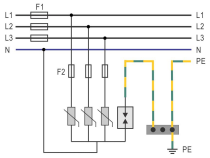
AC System Voltage

L-N/L-L:
120/240V
240/480V

4P Combination

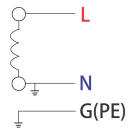


3P+NPE Combination



Difference mode & Common mode Connection Diagram

8

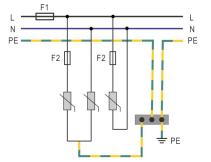


Single Phase
2 Wire + Ground

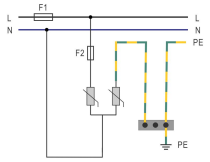
AC System Voltage

L-N:
110V, 120V, 127V
220V, 230V, 240V
277V, 480V

3P Full Protection



2P, L-N, N-PE Mode



Common mode: L-PE, N-PE surge protection
Difference mode: L-N surge protection

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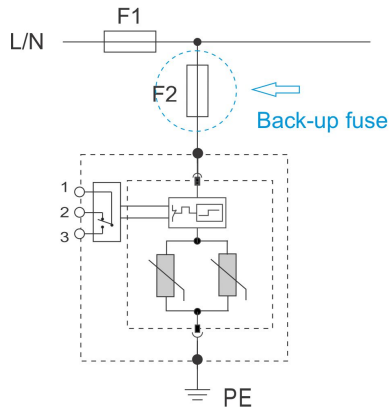
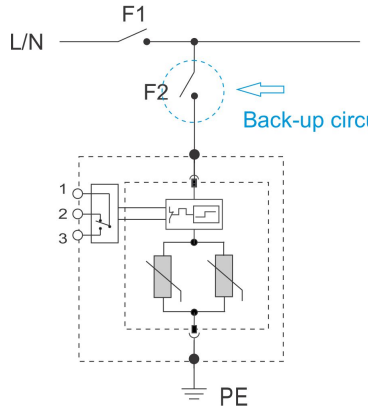
Selection of back-up fuse



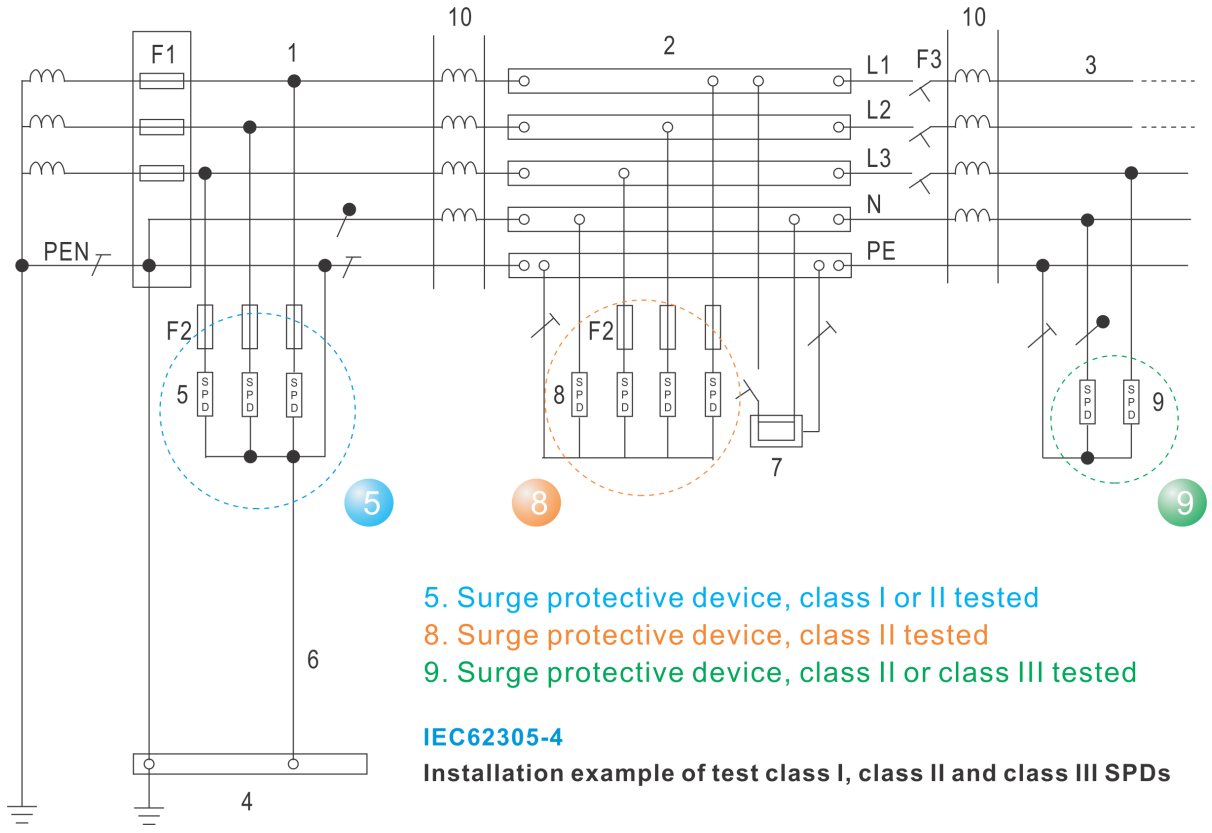
F1 > 125A gL ⇨ F2 = 125A gL
F1 ≤ 125A gL ⇨ ~~F2~~

Selection of back-up circuit-breaker



F1 > 63A ⇨ F2 = 63A
F1 ≤ 63A ⇨ ~~F2~~

Application



5. Surge protective device, class I or II tested
8. Surge protective device, class II tested
9. Surge protective device, class II or class III tested

IEC62305-4

Installation example of test class I, class II and class III SPDs

Key
1. Origin of the installation
2. Distribution board
3. Distribution outlet
4. Main earthing terminal or bar
5. Surge protective device, class I or II tested
6. Earthing connection (earthing conductor) of the surge protective device
7. Fixed equipment to be protected
8. Surge protective device, class II tested
9. Surge protective device, class II or class III tested
10. Decoupling element or line length

F1, F2, F3 overcurrent protective disconnectors
NOTE Refer to IEC 61643-12 for further information.

N-PE Module

WTH-100/G module integrates High-Energy GDT, no leakage current. It pairs WTH-80/B+C/R series surge protector, combined into N-PE protection mode, the two modules are the same in dimension and shape, and are connected with a dedicated bus-bar to achieve a perfect combination.

WTH-100/G Technical Data	
Max. continuous operating voltage (Uc)	255V
Nominal Discharge Current (In)	50kA
Max. Discharge Current (Imax)	100kA
Pulsed Current (Iimp)	37.5kA
Voltage protection level (Up)	1.2kV
Protection Modes	N-PE only
Protective Element	High Energy GDT
Follow Current (If)	100A rms
Response Time (tA)	<100ns
Net Weight Per Unit	0.4Lb (180g)

3P + NPE Combintion Package

Model with suffix	Ordering Code		Model with suffix	Ordering Code
WTH-80/B+C/R/1P-275 x3pcs +NPE	US120254x3N		WTH-80/B+C/1P-275 x3pcs +NPE	US120244x3N
WTH-80/B+C/R/1P-320 x3pcs +NPE	US120255x3N		WTH-80/B+C/1P-320 x3pcs +NPE	US120245x3N
WTH-80/B+C/R/1P-385 x3pcs +NPE	US120256x3N		WTH-80/B+C/1P-385 x3pcs +NPE	US120246x3N
WTH-80/B+C/R/1P-420 x3pcs +NPE	US120257x3N		WTH-80/B+C/1P-420 x3pcs +NPE	US120247x3N

1P + NPE Combintion Package

Model with suffix	Ordering Code		Model with suffix	Ordering Code
WTH-80/B+C/R/1P-275 +NPE	US120254x1N		WTH-80/B+C/1P-275 +NPE	US120244x1N
WTH-80/B+C/R/1P-320 +NPE	US120255x1N		WTH-80/B+C/1P-320 +NPE	US120245x1N
WTH-80/B+C/R/1P-385 +NPE	US120256x1N		WTH-80/B+C/1P-385 +NPE	US120246x1N
WTH-80/B+C/R/1P-420 +NPE	US120257x1N		WTH-80/B+C/1P-420 +NPE	US120247x1N

FAQ & Help

1. What should I do if I can't find the paper manual in the product packaging?
Watchful Eye products is committed to going green with paperless data sheets. On the side of each product enclosure is an engraved link with URL for downloading paperless data sheet and QR code of the website. If you need the paper data sheet, you can open the link and print the data sheet by yourself.

2. The advantages of fault indication windows?
If surge protection fails, the fault indication windows will turn red, thus it can be seen intuitively, and the surge protective device can be replaced in time to avoid damage to the equipment caused by a second surge.

3. What instruments can be used to test whether its surge protection function is normal or not?
Test with a Watchful Eye surge protector tester

4. Can you list more applications?
Power supply panel, whole house

5. What is the feature of Class I+II?
It provides high capability of Class I surge protection, and capability of Class II (equivalent to the parameters of WTH-40) fine protection with low residual voltage as well, applying to Class I and Class II surge protection in multiple areas. If you are not sure which module to choose for protecting your area, Class I + II is the best solution.

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After-sale Services

Watchful Eye provides a 5-year quality warranty globally.

I have a question